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New Species of Mexican Anura

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ABSTRACT: Five species of Mexican tailless amphibia are described as new from the Edward H. Taylor-H. M. Smith collection: *Hyla hazelae*, type locality, Cerro San Felipe, Oaxaca, Oaxaca; *Hyla robustofemora*, Cerro San Felipe, Oaxaca, Oaxaca; *Hyla robertsorum*, El Chico National Park, southern Hidalgo; *Syrrophus latodactylus*, Huasteca Cañon, 15 km. west of Monterrey, Nuevo León; *Eleutherodactylus vocalis*, El Sabino, Uruapan, Michoacán.

WHILE collecting at night on the Cerro San Felipe, a mountain which rises just to the north of the city of Oaxaca, I obtained two specimens of a small species of *Hyla* from brush and weeds growing along a small stream, fed by a spring, at an elevation estimated to be about 2,700 meters.

The frogs were calling from heights of from four to ten feet above the ground. Numerous specimens were heard.

Hyla hazelae sp. nov.

Holotype. EHT-HMS, No. 16263; collected on Cerro San Felipe, about ten miles north of Oaxaca, Oaxaca, August 22, 1938 by Edward H. Taylor.

Paratype. EHT-HMS, No. 16262. Topotype, same date and collector.

Diagnosis. A small *Hyla* with anal flap narrowed and elongated, opening on a level with ventral surface of the femur; below edge of flap a series of much enlarged tubercles; snout slightly truncate; the canthus distinct but somewhat rounded; webs on hand present but greatly reduced; base of thumb enlarged with a patch of horny tubercles which may extend on edge of finger; feet little more than half webbed; tympanum moderate, little less than half diameter of

eye; tibiotarsal joint reaches anterior corner of eye; vomerine teeth between middle of large choanae; subarticular tubercle of outer finger divided.



FIG. 1. *Hyla hazelae* sp. nov. Type. EHT-HMS, No. 16263; Cerro San Felipe, Oaxaca, Oaxaca. Actual snout to vent measurement, 35 mm.

Description of the type. Head very slightly wider than long, the canthus distinct, somewhat rounded; vomerine teeth in two raised, slightly diagonal groups lying completely between the choanae, and not or scarcely reaching their upper level; the groups are transversely oval, separated from each other and the choanae by an equal distance; openings of the mucous glands in the roof of mouth forming a straight line which is closer to the vomerine teeth than to anterior part of mouth; tongue generally oval, very slightly emarginate behind, free for about one-sixth of its length only, more than

half the width of head; openings of the vocal sacs very much elongated (5.5 mm.); distance between choanae, 3.5 mm.; diameter of choanae, 9 mm.

Nostrils pierced near the extreme tip of snout at its upper edge, but the snout slopes forward to lip, the profile in outline is curved; loreal region somewhat concave, sloping very obliquely to lip; eyelid very distinctly narrower than the interorbital distance (3.15 to 4.2 mm.); diameter of eye about equal to its distance from nostril;

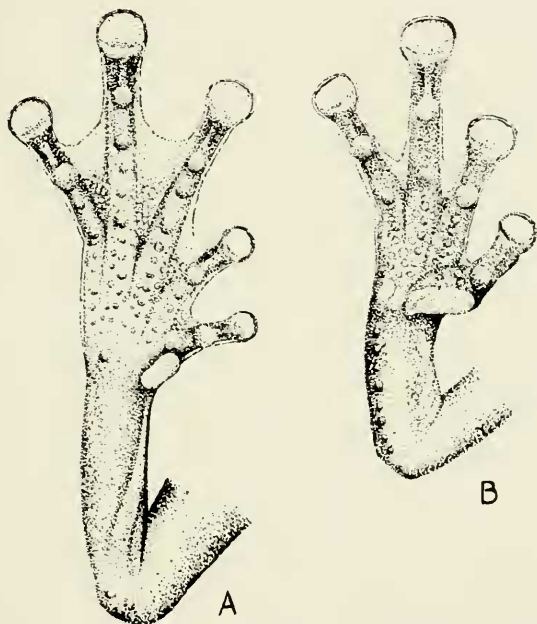


FIG. 2. *Hyla hazelae* sp. nov. Type. EHT-HMS, No. 16263; Cerro San Felipe, Oaxaca, Oaxaca. A. Ventral surface of foot; B. Ventral surface of hand. $\times 3$.

tympanum distinct, small (1.6 mm.), overhung by a very heavy, thickened, somewhat angular fold which passes from eye to near insertion of arm, and conceals the upper part of the tympanum; the areas about nostrils somewhat swollen with a slight depression between them.

When limbs are folded at right angles to the body the heels overlap about two millimeters; the tibiotarsal articulation reaches to very near the anterior edge of the eye; a skinfold across the breast; anal flap lengthened and narrowed with a strong median groove; the anal opening is at about the level of the ventral surface of the femur.

Hand about one-fourth webbed, the webs continued as rather wide margins on the digits to the digital pads; width of the latter distinctly larger than pads on toes; subarticular tubercle of outer finger divided* those on other fingers single, the proximal tubercles of the third and fourth digits are small; a very large, flattened enlargement at base of first finger which bears a patch of dull brown, horny spicules (in paratype these are continued a little onto the edge of the first finger); below the enlargement is an elongated palmar tubercle; outer palmar tubercle bifid (somewhat trifid on right hand); a few distinct supernumerary tubercles; entire under surface of hand with irregular, often indefinite, areolate granules; on under surface of forearm a regular series of rounded tubercles extend from wrist to elbow (these are very distinct, being white or silver-cream on a dark blackish background); feet a little more than half webbed, the webs extended as a fringe to the pads; subarticular tubercles of the third and fourth fingers smallest; a rather large inner metatarsal tubercle, and a small outer one, scarcely distinguishable from the supernumerary tubercles of the sole; a strongly defined tarsal fold to heel.

Skin above appearing rather smooth but actually under the lens it is finely corrugated; sides somewhat wrinkled and granular, the granules indistinct; chin and breast irregularly granular and folded; ventral surface of abdomen and most of under surface of femur evenly areolate, the granules subequal; below anal opening is a row of strongly enlarged salient tubercles.

Color in life. Dorsal surfaces of body and limbs deep leaf green, the ventral surfaces bright lemon yellow. Eyes dark; an ash to gray-lavender line from snout through eye; rows of silver-cream dots under forearm and a similar series on the posterior edge of foot and heel; a silver line above the anus bordered below by black; the large tubercles below anus tipped with silver cream; under surface of hands and feet with considerable pigment; a few minute cream flecks on dorsal surface. Thighs and shanks olive flesh; sides indefinite dark and gray.

Variation. The paratype when caught was a much lighter yellowish-green above, and the posterior parts of thigh were flesh color.

In alcohol there is no trace of the line from snout through eye. The paratype has less pigment under palms and soles. In the preserved specimens there is a lighter area indicated under the eye which I failed to observe in the living specimens.

* Incorrectly shown in figure 2B.

Measurements in mm. Nos. 16263, 16262; sex, ♂, ♂; snout to vent, 35, 35.2; length of snout, 4.8, 5; head width, 11.9, 12.7; head length, 11.2, 11.8; diameter of eye, 3.5, 3.6; greatest diameter of tympanum, 1.6, 1.9; eye to nostril, 3.7, 3.5; distance between nostrils, 3.1, 2.9; width of upper eyelid, 3.15, 3.1; interorbital width, 4.2, 4.5; arm, 23.5, 23.5; hind leg, 57, 58; tibia, 17.5, 18; foot, 25, 26.

Remarks. The species is related to *Hyla bistincta*, which occurs on the same mountain. It differs from that species in the reduced size of the nuptial callosities on the first finger and the absence of asperities on the second finger. The presence of the very large subanal tubercles will distinguish the form from *bistincta* as well as other species of the genus having the narrow, elongated anal flap.

The species is dedicated to Mrs. Hazel Roberts who, with her husband Mr. H. Radclyffe Roberts, assisted in making collections on the Cerro San Felipe.

In the summer of 1938, I obtained a specimen of an undescribed *Hyla* at night, hopping along the edge of a small spring-fed rivulet at an elevation of about 2,300 meters on the Cerro San Felipe. The frog, frightened by my approach, jumped into the rivulet, swam to the opposite side and clambered up the bank, without attempting to hide under the water. Only by an examination of the terminal phalanges did I assure myself that this was not a specimen of the genus *Cauphias*, which it resembles in general habitus. The terminal phalanx is pointed and a small intercalated bone is present between the two distal phalanges.

Hyla robustofemora sp. nov.

Type. EHT-HMS No. 16314, adult male; collected on Cerro San Felipe about ten miles north of Oaxaca, Oaxaca, at an elevation of between seven and eight thousand feet, by Edward H. Taylor.

Diagnosis. Tympanum concealed, but indicated by a depression; no canthus rostralis; a heavy, thickened fold from posterior corner of eye to shoulder, with a branch to above insertion of arm; snout very short; the diameter of eye a third greater than snout length; no web or but the slightest indication of webs between fingers; toes webbed to the digital pads; a well-defined inner and a very dim, flat, outer metatarsal tubercle; a widened flap of skin on inner edge of first toe; anal flap not extending below level of the middle of femur; posterior face of femur not granular or areolate; no fold on breast; vomerine teeth in two rounded groups, which are double the

size of the small, transversely oval choanae; no vocal sac; nuptial callosity covered with dark, horny asperities.

Description of type. Vomerine teeth in two rounded areas, separated from the choanae by a distance twice as great as the distance which separates the tooth groups; vomerine areas, reaching beyond anterior level of choanae and behind posterior level of choanae, double the area of a single choana; the teeth, four in number, irregularly scattered; openings of the mucous glands form a slightly



FIG. 3. *Hyla robustofemora* sp. nov. Type. EHT-HMS, No. 16314; Cerro San Felipe, Oaxaca, Oaxaca. $\times 1$. Actual snout to vent length, 55 mm.

curved line, nearer the front rim of mouth than the choanae; a pigment spot behind the premaxillary region; skin of the roof of the mouth distinctly plicate behind vomerine teeth; tongue wide, sub-circular, very slightly emarginate posteriorly, free for about one-fourth of its length; no vocal sac (at least in the mouth no openings are discernible and there is no external evidence that a sac is present).

Head thick, short, much wider than long; snout distinctly shorter than eye; distance from eye to nostril, the distance between nostrils, and the width of the upper eyelid, are equal; interorbital width greater than that of an eyelid; a heavy thickened fold from eye to middle of body along side above arm, while a branch fold runs to near arm insertion; skin of region behind jaw angle somewhat

thickened leaving a triangular depressed area. In this area is a very small deeper depression, perhaps indicating the position of a concealed tympanum; skin of the dorsal surface lacking tubercles; under the lens the skin is somewhat roughened with irregular corrugations while on the limbs and posterior part of the back the skin is more or less granular (a condition not evident to the naked eye); chin, abdomen and a patch on the proximal part of the ventral side of thigh, areolate, the large granules more or less equal; when arm

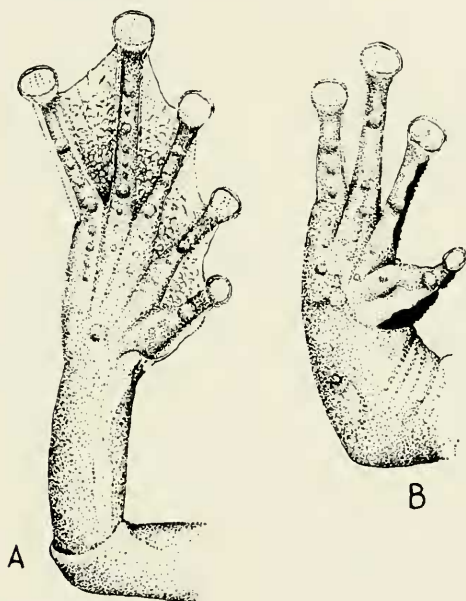


FIG. 4. *Hyla robustofemora* sp. nov. Type. EHT-HMS, No. 16314; Cerro San Felipe, Oaxaca, Oaxaca. A. Ventral surface of foot; B. Ventral surface of hand. $\times 2$.

is extended a very slight axillary web evident; anal flap somewhat elongate, narrowed, grooved medially; anal opening on a level with the middle of femur and followed by a deep groove.

Arms thick; fingers without a trace or only a faint trace of a web; first finger very short, reaching the subarticular tubercle of the second, greatly thickened and widened at base, bearing a large area covered with blackish, horny, nuptial asperities, which are continued, on side of digit, to the pad; a similar patch on second finger, extending to the terminal pad; none on third finger; subarticular tubercle of outer finger not bifid; an elongate tubercle below the nuptial swelling; a large palmar tubercle more or less divided in

three parts; one tubercle under the forearm; legs thickened, the tibiotarsal articulation reaching to near the posterior corner of eye. Toes fully webbed (the last joint of the third toe on one foot, and on one side of the other, is free; I suspect this condition is due to an old injury and is not normal, since the fourth toes are webbed to the pad); a small, oval, inner metatarsal tubercle its length contained in its distance from tip of inner toe, three and one-half times; outer metatarsal tubercle small, flat, more or less indistinct; a more or less distinct, thickened, tarsal fold extends to heel; supernumerary tubercles on sole.

Color. Above, a uniform dull olive-green, somewhat lighter on side of head and body; chin, gray with yellow flecks; abdomen, creamy yellow with some pigmentation posteriorly, especially under posterior part of femur; palms and soles, dark lavender-gray; posterior side of femur gray with a wash of yellow; a cream spot under forearm; a few cream spots on side, on anterior face of femur, and at knee and heel; a dim spot of cream on anal flap.

Measurements in mm. Snout to vent, 55; length of snout, 4.3; length of head, 15.8; width of head, 19; diameter of eye, 5.15; eye to nostril, 4; width of upper eyelid, 4; interorbital space, 5; distance between nostrils, 4; distance between choanae 4.6; transverse diameter of choanae, 0.8; width of tongue, 11; width of a group of vomerine teeth, 1.6; arm, 35.3; leg, 86.2; tibia, 26.5; foot, 39; diameter of toe pad, 2.6; diameter of largest finger pad, 3.1.

Remarks. The general resemblance of this species to the description of a form described by Brocchi as *Cauphias crassum* is rather striking, and were it not for the fact that Brocchi states—"Les dernières phalanges sont obtuses, tronquées à leur extrémité antérieure," and Kellogg states "terminal phalanges T-shaped," I might suspect I had before me a specimen of *Cauphias* closely related to *crassum*. However, the toes and terminal phalanges of this species resemble those of typical *Hyla* and a small intercalated plate is present between the last two phalanges.

The relationship of this species is closest to the species *Hyla robertsonum* from Hidalgo, with which it agrees in lacking a vocal sac, but from which it differs in having the concealed tympanum, the shorter, thicker femurs, shorter snout, the tibiotarsal articulation reaching to back of orbit instead of between orbit and nostril, and the feet almost completely webbed instead of about three-fourths webbed. The heavy, horny excrescences on the nuptial swelling on the base of first digits on hand are blackish-brown. From *H. bis-*

tincta, it may be distinguished by the concealed tympanum, much greater webbing on the toes, less developed canthus and the absence of a vocal sac. From other Mexican hylas, it may be distinguished by the absence of a vocal sac.

I obtained a large series of an undescribed species of the genus *Hyla* while collecting in the El Chico National Park, near Pachuca, Hidalgo, with Mr. and Mrs. Radclyffe Roberts. The specimens were found in plants along the tiny spring-fed rivulets that cross the open meadows. The leaves of the plants are large and at the base of the petiole small pockets of water are held. It was in this specific habitat that most of the specimens were found. The frogs were discovered early in the morning, at which time they were very inactive due to the cold. Later they became more active and if disturbed would dive into the water and take refuge in the mud at the bottom of the stream.

During the several days spent in the vicinity none was heard calling. Lacking a vocal sac it may be that the voice is weak and inaudible at a distance at which frogs may usually be heard. In the same habitat I obtained *Hyla lafrentzii*, *Hyla eximia* and a form belonging to the *Rana pipiens* complex.

I dedicate the species to Mr. and Mrs. Roberts, who helped collect the type series.

Hyla robertsororum sp. nov.

Holotype. EHT-HMS No. 16264; collected at El Chico National Park, Hidalgo, August 7, 1938, by Mr. and Mrs. Radclyffe Roberts and E. H. Taylor.

Paratype. EHT-HMS Nos. 16265-16313, same place, date and collectors as the type.

Diagnosis. A medium-sized member of the genus, characterized by the absence of vocal sacs in males, a tympanum half the diameter of eye, fingers free, toes two-thirds to three-fourths webbed; canthus rounded, eye slightly shorter than snout; tibiotarsal articulation reaching posterior corner of eye; vomerine teeth reaching anterior level and extending behind the posterior level of choanae; digital pads on fingers very slightly larger than those on toes.

Description of the holotype. Vomerine teeth on two rounded elevations, lying between the choanae, reaching anterior, and extending behind their posterior level, each group much larger than a choana; distance between the groups of vomerine teeth greater than their

diameter and greater than their distance from choanae; tongue very broad, subcircular, minutely notched behind, free for about one-fourth of its length; mucous glands, behind premaxillaries, open in an irregular, more or less doubly curved discontinuous groove somewhat closer to the vomerine teeth than to the anterior part of mouth.

Head slightly broader than long, the eyes not especially prominent; nostril closer to eye than the median anterior point of upper

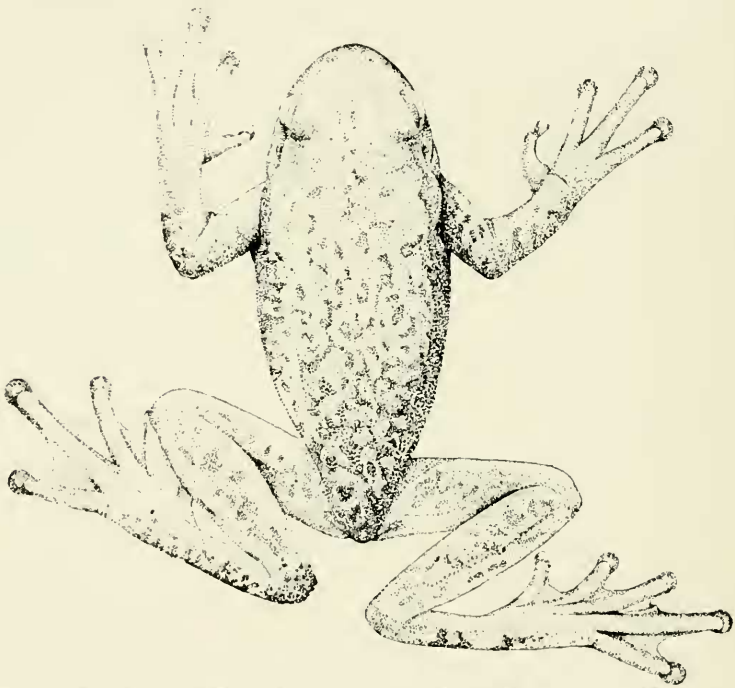


FIG. 5. *Hyla robertsoni* sp. nov. Type. EHT-HMS, No. 16264; El Chico National Park, Southern Hidalgo. Actual snout to vent length, 48 mm.

lip; tip of snout projecting but slightly beyond mouth; loreal region not or but slightly concave, sloping obliquely to edge of lip; interorbital space (5 mm.) much wider than an upper eyelid (3.1 mm.); latter less than distance between eye and nostril (4.2 mm.); tympanum moderately distinct; diameter of tympanum (2.3 mm.) about half length of eye (4.2 mm.); a slight depression on middle of snout between nostrils; skin appearing rather smooth (under lens the skin appears somewhat roughened); a fold from eye to foreleg; no fold from eye to shoulder; chin and breast with a few pustular tubercles; abdomen and the median underside of femur granular; a triangular

granular area on posterior side of femur below anus, divided by a deep groove from anus; anal flap short, somewhat pointed, marked with vertical furrows.

Fingers practically free (only a very minute trace of webbing at the base of the fingers), the fleshy margin on outer edge of the second and third finger a little wider than on the inner edge; first finger with an elongate, flattened projection at base and an elongate palmar tubercle below it; a median elongate palmar tubercle and an

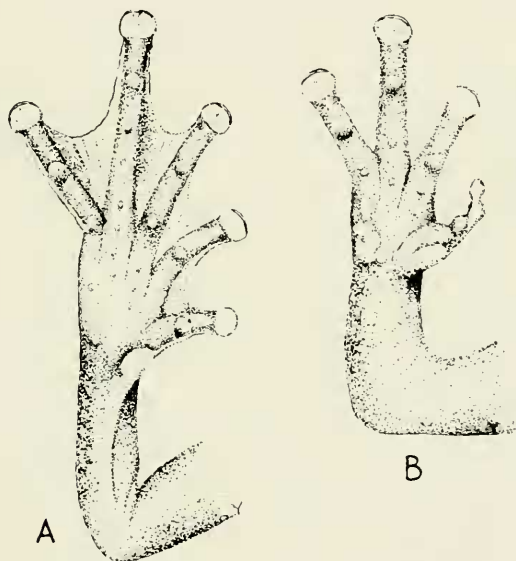


FIG. 6. *Hyla robertsonum* sp. nov. Type. EHT-HMS, No. 16264; El Chico National Park, Southern Hidalgo. A. Ventral surface of foot; B. Ventral surface of hand. $\times 2$.

outer more elongate one divided transversely; subarticular tubercles of first and last fingers larger than those of the middle fingers; that of outer finger not bifid; supernumerary tubercles on palm; a few irregular tubercles on under surface of arm forming a longitudinal row; first finger reaches a little beyond the subarticular tubercle of the second finger; foot two-thirds to three-fourths webbed, the web continued to the pads as a narrow fringe; a well-defined fringe on outer side of fourth toe; a well-defined inner metatarsal tubercle, flat, oval, its length contained in its distance from tip of first toe about three times; outer tubercle small, distinct; supernumerary tubercles confined to sole; a thickened tarsal fold extends to heel; a slight fold across breast; only a trace of an axillary web.

Measurements of the holotype in mm. Snout to vent, 48; width of head, 16; length of head, 14.5; arm, 28.2; leg, 78; tibia, 25; foot, 36; width of finger pad, 2.8; of toe pad, 2.3.

Color. Above, dull olive to brownish-olive with numerous ashy flecks and reticulations; sides brown-ash with a few cream flecks; belly and underside of limbs dirty cream, the pigment thickest on chin and throat; concealed part of feet somewhat olive-yellow, with a few spots and reticulations of this color on the posterior side of foot; posterior face of femur olive with a yellowish wash.

Variations. The males have the base of the first finger greatly swollen, studded with minute spinules which are covered with a very slight, very light brown, horny deposit; a similar line of spinules on the inner edge of the second finger and a tiny patch on the third; a few specimens show no trace of web between fingers; in others there is a trace evident under the lens.

The vomerine teeth are in transverse groups in some specimens and are no longer than a choana. Certain specimens are blackish olive, and the venter and under side of limbs much more heavily pigmented; certain specimens have a few yellow flecks on or above the anal flap; in younger specimens the tibiotarsal joint reaches the anterior corner of eye or slightly beyond.

Remarks. The species needs to be compared only with the recently described species *Hyla robustofemora*. It differs from that species in the presence of a tympanum, the lesser webbing of the toes and the slenderer limbs; in *H. robustofemora* the feet are fully webbed. The two forms agree in lacking a vocal sac and in the character of the nuptial asperities, save that in *H. robustofemora* they are covered with heavy black-brown horn.

A species of frog, first discovered in the central part of Nuevo León, later in the southern part of that state and northern Hidalgo, appears to belong to the genus *Syrrhophus* Cope. It is distinctly larger than the other known species from Mexico, and two of the eight specimens show evidence of vomerine teeth. Otherwise the specimens agree in the characters associated with the genus.

The small, flat, inguinal gland commonly present in *Syrrhophus* (dim or wanting in *S. marnocki*) is present; a flat parotid-like glandular area behind tympanum; a ventral disk limited posteriorly by a transverse fold; finger and toes lacking distinct webs, and bearing the typical distribution of tubercles on sole and palm, cause me

to associate the species with *Syrrophus* rather than *Eleuthero-dactylus*.

The two specimens that have vomerine teeth are from southern Nuevo León, geographically intermediate between the other two localities. One specimen has the group of teeth present on one side only; in the specimen chosen for the type, on both sides. Only larger series from the type locality can determine the extent to which the teeth are present. That the whole series are of the same stock is shown by their close agreement in other characters.

Syrrophus latodactylus sp. nov.

Holotype. EHT-HMS No. 6807, collected at Huasteca Cañon, about 15 km. west of Monterrey, Nuevo León, Mexico, elevation about 680 meters, June 20, 1936, by Edward H. Taylor.

Paratypes. EHT-HMS No. 6805, near Sabinas Hidalgo, N. L. June 17, 1936; Nos. 6809-6812, La Placita (about 8 km. south Jacala, Hidalgo, July 1, 1936; E. H. Taylor, collector).

Diagnosis. A large member of the genus, maximum size 38.2 mm.; tympanum two-thirds to three-fourths the diameter of eye; vomerine teeth present or absent; a small flat gland above groin and a small, flat parotoid; head wider than body; largest digital disks about two and one-half to three times narrowest width of digit; yellowish or light lavender above with deep brown spots or reticulations.

Description of the type. Adult female containing large eggs in ovaries. Head as broad as long, the snout narrowing, then slightly truncate at tip; canthus rostralis rounded, the lores sloping slightly, not concave; eyelid contained in the interorbital distance about one and one-half times; length of eye about equal to its distance from nostril, shorter than snout; diameter of the tympanum (3 mm.) equal to two-thirds the length of the eye (4.5 mm.); distance between nostrils (3 mm.) much less than interorbital distance (5 mm.); tongue rather short, somewhat narrowed anteriorly, not notched behind; two small groups of vomerine teeth, each about as long as the greatest diameter of choanae, separated from each other by a distance greater than length of either group and from choanae by a still greater distance, both groups lying much behind the posterior level of choanae; mucous glands open by a series of pores directly between the middle of the choanae; choanae large, diameter 1.2 mm.

Skin above on head nearly smooth; on back and upper sides of body with very small inconspicuous pustules; chin, breast, and en-



PLATE XLIII

Syrrophus latodactylus sp. nov.

- A. EHT-HMS, No. 6805; Sabinas Hidalgo, Nuevo León. Length, 31.5 mm.
 B. EHT-HMS, No. 6806; Huasteca Cañon, Nuevo León. Length, 32 mm.
 C. EHT-HMS, No. 6812; La Placita, Hidalgo. Length, 34 mm.
 D. EHT-HMS, No. 6809; La Placita, Hidalgo. Length, 34 mm.
 E. EHT-HMS, No. 6810; La Placita, Hidalgo. Length, 32 mm.
 F. EHT-HMS, No. 6807. Type. Huasteca Cañon. Length, 38.2 mm.

ture abdomen completely smooth. A "disk" on venter limited posteriorly by a transverse skin fold, the anterior limit not clearly defined; underside of thighs with wrinkles, forming a flat reticulum, rather than the typical areolar granules; some granules on the posterior part of the thigh.

Digits of hand with their tips widely dilated, the widest (third and fourth fingers) being 2.6 mm., that on inner finger about double the narrowest width of digit; a large median palmar tubercle; a

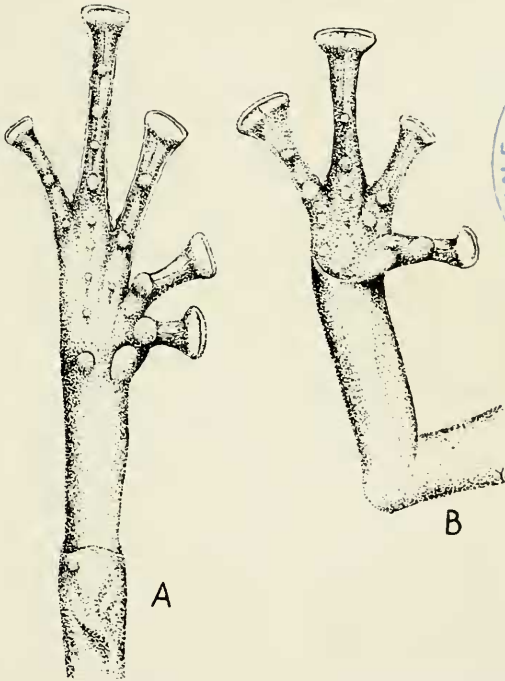


FIG. 7. *Syrrhophus latodactylus* sp. nov. Type. EHT-HMS, No. 6807, Huasteca Cañon, 15 km. W. Monterrey, Nuevo León. A. Ventral surface of foot; B. Ventral surface of hand. $\times 3$.

smaller one on base of first finger; and a still smaller outer; five other enlarged supernumerary tubercles on palm, anterior to the three palmar tubercles; subarticular tubercles prominent; a very indistinct dermal fringe is evident on edges of digits, the fringe somewhat granulate at the base of the digits; foot short, the digits much widened at tips, but less so than those of fingers; a large inner metatarsal tubercle, its length contained in length of first toe slightly more than one and one-half times; outer tubercle prominent, smaller; subarticular tubercles well developed; three middle

toes with well-developed supernumerary tubercles on sole; a slight (or sometimes deep) transverse groove is evident on the tips of toes; tibiotarsal articulation when brought forward reaches middle of eye.

Color in life. Above light lavender to yellowish-gray with dark brown or blackish-brown spots and reticulations on dorsal and lateral surfaces, and above limbs. Abdomen and most of underside of femur immaculate cream; a very fine peppering of scattered pigment on chin, low on sides of body and under the tibia, hand and foot; a more or less indistinct dark band from nostril to eye, and a spot, bordering tympanum above, usually conspicuous; posterior part of femur with some scattered fine dark pigment and a few small spots about anus.

Measurements in mm. Nos. 6807, 6811, 6810, 6806; snout to vent, 38.2, 35, 32, 32; width of head, 15.2, 13, 13.8, 13.2; length of head, 14.9, 12.8, 12.9, 12.5; diameter of tympanum, 3.1, 2.5, 3, 3; length of eye, 5, 4.2, 4.05, 4.3; eye to tip of snout, 7.5, 5.8, 6.5, 6.1; arm, 24.3, 23.8, 23.2, 19.5; width of largest pad, 2.8, 2, 2, 2; leg, 56, 53.2, 49, 47.5; tibia, 17.6, 17.1, 15.5, 15; foot, 25, 23.6, 20.5, 21.

Variation. The specimens agree in most essential characters. Those from the higher more southern localities seem to be more lavender on the dorsal surfaces; those from the more northern and lower localities, more yellowish. After two years of preservation they are practically indistinguishable in color. In the specimen from Sabinas Hidalgo, the spotting on the hind limbs is practically obsolete. Variation in presence or absence of teeth has been mentioned. Other variations are discernible from the table of measurements.

Remarks. The widening of the digital pads is greater proportionally than in any other Mexican form referred to, *Syrrhophus*, *Tomodactylus*, or *Eleutherodactylus*, with the exception of those of *Eleutherodactylus alfredi* and *E. spatulatus*.

The first specimen of the species was found hopping among boulders in a dry stream bed, about four kilometers from the town of Sabinas Hidalgo. This locality is about 345 meters in elevation. The type and one other specimen were obtained from the exposed low rock masses near the entrance of Huasteca Cañon, near Monterrey. Both were found at the edges of deep crevices into which other specimens seen, escaped. The elevation here is about 680 meters. At La Placita (a station marked on the highway without houses) the specimens were found at night among outcropping boulders in oak forest at an elevation of about 1,700 meters.

The large eggs found in the ovaries suggest a shortened life history.

With the discovery of more forms in this and the related genera *Tomodactylus* and *Eleutherodactylus* (*sensu lato*) which suggest characters intermediate between them, it will become increasingly difficult to maintain these genera under their present definitions. This is particularly true of *Syrrhophus* and *Tomodactylus* whose differentiation depends upon a difference in the development or shape of the gland in the upper inguinal or lumbar region.

Eleutherodactylus vocalis sp. nov.

Type. EHT-HMS No. 6390; collected Hda. El Sabino, Uruapan, Michoacán, July 25, 1936 by Hobart M. Smith.

Paratypes. EHT-HMS Nos. 6384-6386, June, 1936, Don Julio Ramon Bresson, collector; Nos. 6387-6389, 6391, July 23 to 25, 1936, Hobart M. Smith, collector; all from Hda. El Sabino, Uruapan, Michoacán.

Diagnosis. A medium-sized species (known maximum size 57.5 mm. snout to vent), related to *Eleutherodactylus rugulosus*; tips of digits with widened disks, those of toes very distinctly wider than those on fingers; all disks with a transverse terminal groove; five supernumerary tubercles on palm; none on foot; no web on hand; toes about one-third webbed, the webs continued to tips as distinct fringes; a small outer metatarsal tubercle; a small tubercle on lores; a W-shaped series of pustules more or less defined on back of head and shoulders; heels do not touch when limbs are folded; tibiotarsal articulation reaches between eye and nostril; eye shorter than snout; tympanum of females less than half of length of eye; of males, two-thirds of eye; male with vocal sacs.

A



B



PLATE XLIV

Eleutherodactylus vocalis sp. nov.

A. Type. EHT-HMS, No. 6390; El Sabino, Uruapan, Michoacán. Snout to vent length, 50 mm.

B. Paratype. EHT-HMS, No. 6389. Topotype. Snout to vent length, 50.5 mm.

Description of the type. Adult female containing eggs in ovaries. Snout with canthus rostralis rounded; a depression in loreal region; snout rounded, slightly projecting beyond mouth; eye moderately large, its length (5.9 mm.) distinctly less than length of snout (8.3 mm.); distance between nostrils (3.8 mm.), about equal to the

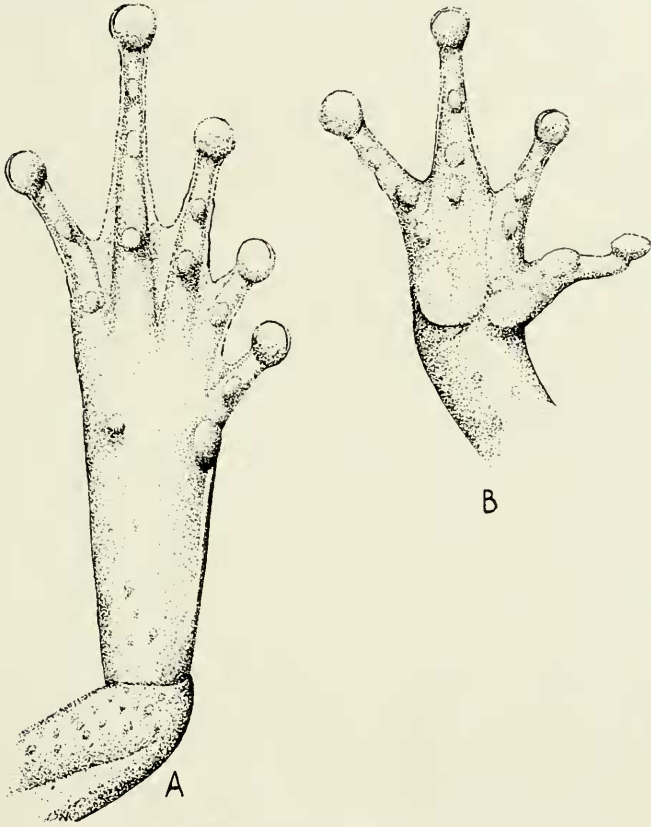


FIG. 8. *Eleutherodactylus vocalis* sp. nov. Type. EHT-HMS, No. 6390; El Sabino, Uruapan, Michoacán. A. Ventral surface of foot; B. Ventral surface of hand. $\times 3$.

interorbital distance (3.9 mm.); eyelid (4.2 mm.) somewhat greater than the interorbital width; tympanum higher than long, its length (3 mm.) about half length of eye, separated from posterior corner of eye by a distance about equal to length of tympanum. Snout rounded, slightly projecting; tongue subcircular, notched behind; vomerine teeth in two strongly raised triangular clusters very narrowly separated (one-fourth width of one cluster), separated from

choanae by a distance greater than length of one cluster; the clusters between choanae, but not reaching their posterior level; two openings of palatal mucous glands medial, slightly in advance of the anterior level of choanae; choanae large, diameter of one contained in the distance between choanae, three and one-half times.

Fingers and toes with broad terminal disks, those of toes distinctly larger than those of fingers; the disks without a transverse ventral groove, but with a terminal transverse groove strongly pronounced. First and second fingers subequal in length; fourth longer than third; no webs on fingers, but slight ridges visible on inner edges of some of the fingers; subarticular tubercles large, rounded; five supernumerary tubercles on palm; a large, wide, palmar pad, notched in front and another elongate pad on outer base of first finger, its length in its distance from tip of first finger, two times; toes between one-third and one-half webbed, the webs continuing as narrow fringes to disks (see figures); subarticular tubercles elongate oval; no supernumerary tubercle on toes or sole; an elongate inner metatarsal tubercle, contained in its distance from tip of first toe, two and one-half times; outer tubercle low, small, reaching anterior level of inner; a sharply defined tarsal fold extends half length of tarsus, or slightly farther.

Skin strongly pustulate, the pustules forming an indistinct W-shaped pattern on back of head and shoulders, and on the sides they form somewhat irregular rows; a conspicuous pustule in loreal region; eyelids heavily pustulate; groin and anterior and posterior parts of femur smooth; a heavy fold passing angularly back from eye and overhanging upper edge of tympanum; two large tubercles behind lower posterior edge of tympanum; a sparse row of tubercles under forearm; chin and throat nearly smooth; sides and abdomen, posteriorly, strongly granulate, the ventral disk not or only faintly indicated; ventral part of femur, save near anus, perfectly smooth. A triangular area on posterior face of femurs below anus strongly granular; when legs are folded at right angles to body the heels are minutely separated; tibiotarsal articulation reaches between eye and nostril, when leg is brought forward.

Color. Above, light gray with an indefinite pattern of darker gray; summits of pustules dull white; a median gray spot on shoulders. Ventral surfaces cream, more or less peppered with scattered pigment; under side of tibia mottled with gray; limbs barred with darker and lighter; snout generally lighter gray; a dark indefinite bar across head between eyes.

Measurements in mm. Nos. 6390, 6387; sex ♀, ♀; snout to vent, 50, 57.5; width of head, 19.1, 22; length of head, 18, 21.8; arm, 26.4, 34; leg, 72.5, 87; tibia, 23, 27.3; foot, 31.8, 37.2; eye length, 5.9, 6.5; tympanum, 3, 3.4.

Variation. All the specimens save No. 6388 are females and agree with the type in all essential characters; all seem to have more pigment on chin, breast, and back than type. On the distal posterior face of femur there are distinct cream spots. The tympanum of the male is a little longer than high (3.2 mm.), distinctly more than half the length of eye (5.7 mm.); the male has well-developed vocal sacs, the openings behind the tongue elongate; and it is distinctly less pustulate than females.

Remarks. This form may be distinguished from the related *Eleutherodactylus rugulosus* by the greater webbing on toes; by the somewhat more robust body; the presence of vocal sacs in the males; and the tympanum smaller in proportion to the eye.

